

AN ANNOTATED CHECKLIST OF THE CADDISFLIES
(TRICHOPTERA) OF MISSISSIPPI AND
SOUTHEASTERN LOUISIANA. PART III:
LIMNEPHILOIDEA AND CONCLUSIONS¹

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Abstract.—Distributional records for 63 species of caddisflies in the superfamily Limnephiloidea (Phryganeidae, Brachycentridae, Limnephilidae, Lepidostomatidae, Sericostomatidae, Odontoceridae, Molannidae, Helicopsychidae, Calamoceratidae, Leptoceridae) from Mississippi and southeastern Louisiana are presented and seasonal occurrence of each is indicated. Annotations for many species include notes on habitat and relative abundance. Of the species reported, 58 represent new state records for Mississippi and 60 are newly recorded from Louisiana. Faunal composition and distribution of the order in the study area are discussed.

This is the third and final contribution in a three part series on the caddisflies of Mississippi and southeastern Louisiana. In this section records are presented for 63 species in 22 genera from the families Phryganeidae, Brachycentridae, Limnephilidae, Lepidostomatidae, Sericostomatidae, Odontoceridae, Molannidae, Helicopsychidae, Calamoceratidae, and Leptoceridae. Sixty-two percent of the species reported belong to the Leptoceridae.

Literature records of Limnephiloidea from Mississippi and Louisiana are very few and scattered, and include the following: Hagen (1861) described *Platycentropus amicus* (as *Hallesus*) from New Orleans, Louisiana; Ross

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(1962) described *Agarodes stannardi* (as *Sericostoma*) from Marshall Co., Mississippi; Flint (1972) described the male of *Ironoquia kaskaskia* (Ross) (as *I. brysoni*) from Oktibbeha Co., Mississippi; Ross and Scott (1974) described *Agarodes libalis* from Jackson Parish, Louisiana; and Haddock (1977) recorded *Nectopsyche spiloma* (Ross) from Louisiana and Mississippi and *N. candida* (Hagen) and *N. pavida* (Hagen) from Mississippi.

Additional records indicated in the text were obtained from the Louisiana State University Collection (LSUC). Collection site numbers correspond to those listed in Part I.

LIST OF SPECIES

Phryganeidae

Agrypnia vestita (Walker). Sites 2, 9, 10, 13, 14, 16, 19, 22, 23, 44, 90, 100. 7 Apr.–12 July, 11 Sept.–24 Oct. Fairly common in the northern half of the study area.

Ptilostomis ocellifera (Walker). Sites 3, 16. 16 June, 2 July, 26 July. Uncommon.

Ptilostomis postica (Walker). Sites 3, 4, 16, 18, 19, 23, 26, 85, 104. Additional record from Baton Rouge, East Baton Rouge Parish, LA (LSUC). 16 Apr.–14 July, 27 Aug.–27 Sept. Collected near rocky streams, muddy ponds and sand-bottomed reservoirs. Widespread but not common.

Brachycentridae

Brachycentrus numerosus (Say). Larvae collected from sites 81, 123, 125. Adult records from Magnolia, Plaquemines Parish, LA, 28 Feb., (LSUC). This species is fairly common and widespread in the CP. Larvae were collected from submerged logs and aquatic vegetation in strong currents of clear, fast flowing streams. This was the earliest emerging caddisfly in the study area.

Micrasema wataga Ross. Sites 71, 92, 97, 108, 120. 25 May–30 Aug. Widespread in the CP but not common. Most often collected near clear, cool, blackwater streams having abundant aquatic vegetation.

Limnephilidae

Ironoquia kaskaskia (Ross). Site 23. Additional record from Fluker, Tangipahoa Parish, LA (LSUC). 14 Oct.–7 Nov. Rare.

Ironoquia punctatissima (Walker). Sites 6, 7, 10, 11, 13, 16, 19, 23, 44, 116. 9 Sept.–8 Nov. Widespread but not common. Collected along a wide variety of aquatic habitats.

Limnephilus prob. *submonilifer* Walker. Site 7. A single small larva was collected in May. Our identification is tentative until we can associate it with adults. *L. submonilifer* is the only *Limnephilus* recorded from the

neighboring states of Arkansas (Unzicker et al., 1970) and Tennessee (Etnier and Schuster, 1979). The larva was described by Flint (1960).

Platycentropus amicus (Hagen). The female holotype is from New Orleans. Ross (1938) described the male (as *P. plectrus*) from Michigan and Wisconsin. This rare species has not been collected from the study area since Hagen's time.

Platycentropus radiatus (Say). Based on a single male from Moss Point, Hancock Co., Miss. 26 May.

Pycnopsyche indiana (Ross). Site 127. 17 Oct. Rare. Collected from a small, spring-fed, black-water stream.

Pycnopsyche lepida (Hagen). Site 23. 22 Oct.–28 Oct.

Pycnopsyche luculenta (Betten). Sites 11, 14, 16, 17. 1 Oct.–30 Oct. Collected along small streams, ponds and bogs.

Pycnopsyche scabripennis (Rambur). Sites 10, 11, 13, 14, 17, 44, 103, 127. 1 Oct.–30 Oct. The most common and widespread *Pycnopsyche* in the study area, the majority of specimens were collected near small reservoirs.

Lepidostomatidae

Lepidostoma sp. Site 7. Based on larvae collected in May.

Sericostomatidae

Agarodes crassicornis (Walker). Sites 16, 21, 86, 89, 93, 96, 97, 98, 100, 102, 108, 114. 18 May–30 June. Fairly common. Associated with cool streams and springs.

Agarodes libalis Ross and Scott. Sites 86, 108, 120, 128. 23 May–4 June. This CP endemic has a narrow emergence period in the spring of the year and was always associated with spring-fed, black-water streams.

Agarodes stannardi (Ross). Sites 7, 16. 16 May, 21 May, 30 May. This rare species is known only from the type-locality and vicinity and is associated with cool, sandy springs.

Odontoceridae

Psilotreta rufa Hagen. Sites 1, 7, 17. 16 May, 21 May, 28 May. Not common. Limited to cool, rocky springs. Previously known only from the Northeast (Ross, 1944).

Molannidae

Molanna blenda Sibley. Sites 7, 16, 124. 28 March–12 June. Larvae and adults were collected from springs.

Molanna tryphena Betten. Sites 70, 127, 128. 21 March, 29 March, 4 June. Associated with CP black-water streams. Larvae were very common at sites 127 and 128.

Molanna ulmerina Navas. Sites 87, 125. 1 April, 25 Sept. Rare. The collection of adults in September suggest that this species may have two generations per year in the study area.

Helicopsychidae

Helicopsyche borealis (Hagen). Sites 38, 57, 58. 20 June, 22 Sept., 13 Oct. In Mississippi larvae were collected in shallow, gravel expanses of clear, well aerated streams.

Calamoceratidae

Anisocentropus pyraloides (Walker). Sites 39, 59, 60, 86, 97. 19 April-7 June. Collected near small, cool, black-water streams.

Leptoceridae

Ceraclea cancellata (Betten). Sites 33, 114. 17 April, 10 May.

Ceraclea diluta (Hagen). Site 100. 6 April. Collected near a shallow, sand-bottomed pond.

Ceraclea flava (Banks). Sites 40, 44, 59, 63, 65, 73, 80, 83, 102. 23 May-20 June. Usually associated with large, slow moving rivers.

Ceraclea maculata (Banks). Sites 2, 5, 7, 10, 11, 16, 17, 20, 23, 25, 26, 32, 33, 34, 37, 40, 44, 45, 51, 52, 56, 57, 58, 59, 62, 65, 67, 69, 73, 80, 83, 86, 91, 92, 93, 95, 97, 100, 101, 106, 108, 117, 119, 121, 122, 126, 127, 129. 9 April-17 Oct. The most common and widespread *Ceraclea* in the study area. Collected along a wide diversity of aquatic habitats.

Ceraclea nepha (Ross). Sites 2, 11, 16, 19, 23, 25, 45, 59, 86. 18 April-27 Oct. Collected from a variety of habitats in the study area. Previously known from the central states (Morse, 1975).

Ceraclea ophiodera (Ross). Sites 16, 40, 47, 58, 71, 79, 80, 83, 84, 97, 101, 117, 120. 23 May-22 Sept. Widespread and common in the southern half of the study area.

Ceraclea protonepha Morse and Ross. Sites 2, 11, 16, 24, 25, 28, 34, 66, 86. 19 April-27 June. Specimens were commonly collected near small, sandy streams.

Ceraclea resurgens (Walker). Sites 122, 124, 125. 28 March, 1 April, 9 April. This obligate sponge feeder was always associated with medium-sized, black-water streams. Adult emergence period was very brief.

Ceraclea slossonae (Banks). Site 51. 27 May.

Ceraclea spongillovorax (Resh). Sites 7, 118, 128. 6 Aug., 18 Sept., 1 Oct. Several specimens were collected near a small, spring-fed reservoir.

Ceraclea tarsipunctata (Vorhies). Sites 5, 6, 7, 15, 16, 19, 23, 26, 28, 29, 32, 33, 36, 44, 49, 51, 59, 63, 73, 80, 85, 88, 93, 100, 115, 132. 29 March-11 Nov. Widespread and common across the study area. There is probably more than a single generation per year for this species in our area.

- Ceraclea transversa* (Hagen). Sites 28, 84. 9 May, 16 June. Collected from small, sandy streams. Rarely encountered.
- Leptoceris americanus* (Banks). Sites 16, 24, 25, 32, 44, 51, 52, 66, 110, 120, 126. 19 April–31 May. Usually associated with streams and ponds having abundant beds of aquatic vegetation, especially *Ceratophyllum*.
- Nectopsyche albida* (Walker). Sites 16, 19, 23, 32. 8 May–17 June.
- Nectopsyche candida* (Hagen). Sites 2, 7, 16, 17, 23, 40, 43, 44, 45, 51, 52, 56, 67, 80, 81, 87, 90, 92, 100, 103, 105, 112, 114, 115, 116, 119, 120, 126, 127, 129, 131. 17 April–20 Oct. Widespread and common.
- Nectopsyche exquisita* (Walker). Sites 2, 16, 35, 38, 49, 57, 59, 71, 73, 87, 91, 110. 21 May–13 Oct. As widespread but somewhat less common than *N. candida* in the study area.
- Nectopsyche pavida* (Hagen). Sites 2, 51, 57, 58, 61, 62, 67, 80, 81, 90, 92, 119. 11 April–29 Sept. Collected mostly near CP streams.
- Nectopsyche spiloma* (Ross). Site 51. 7 July.
- Oecetis avara* (Banks). Sites 83, 84, 87. 10 June, 16 June, 10 Sept., 20 Sept. Rarely encountered.
- Oecetis cinerascens* (Hagen). Sites 2, 8, 10, 16, 20, 25, 30, 31, 32, 35, 37, 44, 50, 51, 52, 65, 66, 73, 87, 114, 126, 132. 11 April–8 Oct. Collected near small reservoirs and a variety of stream types throughout the study area.
- Oecetis daytona* Ross. Sites 91, 102. 24 May, 5 Aug. An apparent CP endemic. Previously known only from the type-locality in Florida (Ross, 1947).
- Oecetis ditissa* Ross. Sites 2, 5, 11, 13, 16, 24, 25, 28, 34, 40, 49, 62, 63, 83, 84, 85, 86, 100, 127, 128. 15 April–17 Oct. Widespread and common.
- Oecetis georgia* Ross. Sites 118, 127. 6 Aug.–17 Oct. A rare CP endemic. Collected only along spring-fed, black-water streams. Known previously from Georgia (Ross, 1941).
- Oecetis inconspicua* (Walker). Sites 2, 4, 9, 10, 11, 13, 14, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 28, 30, 31, 32, 33, 35, 36, 40, 43, 44, 49, 50, 51, 59, 62, 63, 65, 66, 68, 69, 71, 73, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 92, 93, 99, 100, 102, 103, 107, 109, 110, 111, 112, 114, 115, 116, 120, 125, 126, 127, 128, 129, 131, 132. 15 March–21 Nov. One of the most common caddisflies occurring in the study area.
- Oecetis nocturna* Ross. Sites 2, 24, 26, 34, 83, 114, 127. 8 May–17 Oct. Taken from a variety of habitats including reservoirs and small, sandy streams.
- Oecetis osteni* Milne. Sites 7, 16, 28, 37, 56, 62, 66, 69, 71, 90, 92, 93, 95, 97, 100, 101, 102, 103, 126, 129, 131. 5 April–18 Oct. Although widespread, this species was more common in the CP.
- Oecetis persimilis* (Banks). Sites 2, 14, 28, 34, 52, 61, 77, 79, 83, 84, 91, 92, 97, 122, 126. 9 April–13 Oct. The distribution and abundance of this species in the study area is similar to those of *O. osteni*.

- Oecetis sphyra* Ross. Sites 60, 67, 78, 80, 81, 83, 90, 93, 95, 97, 103, 117, 120, 127, 128. 23 May–18 Oct. Limited in distribution to the CP.
- Setodes dixiensis* Holzenthal. Sites 61, 79, 80, 117, 118. 11 April–6 Aug. Associated with cool, clear, fast flowing, medium-sized streams in the CP.
- Trienodes abus* Milne. Sites 19, 34, 122. 9 April, 10 May, 12 May. Collected near small, sandy streams. Most members of this genus were rare in our area and records for many species represent rather significant range extensions.
- Trienodes flavescens* Banks. Sites 38, 87. 19 Sept.–13 Oct.
- Trienodes ignitus* (Walker). Sites 16, 18, 29, 51, 57, 60, 69, 79, 80, 84, 97, 101, 103, 122, 127, 128. 9 April–28 July, 17 Oct. Common and taken along a variety of aquatic habitats but never in large numbers.
- Trienodes inflexus* Morse. Site 16. 14 June. Very rare. Our specimens were collected rather far from water. Previously known only from South Carolina (Morse, 1971; Morse et al., 1980).
- Trienodes marginatus* Sibley. Sites 11, 14. 3 May, 30 May, 17 July. A widespread eastern species. Specimens were collected near a shallow, sandy stream and a muddy stream.
- Trienodes melacus* Ross. Sites 28, 30. 8 May, 9 May. Collected along a small stream and a sand bottomed reservoir. Previously known only from Illinois (Ross, 1947).
- Trienodes nox* Ross. Site 29. 9 May. These specimens were collected near a small farm pond. Very rare.
- Trienodes ochraceus* (Betten and Mosely). Sites 24, 29, 34, 86, 100. 19 April–18 May. Rare. Formerly known only from Burke Co., Georgia and Aiken Co., South Carolina (Morse et al., 1980). Our specimens were collected near small, sandy streams and small ponds.
- Trienodes pernus* Ross. Sites 11, 14, 29, 69, 92, 129, 131. 9 May–17 July, 18 Sept. Fairly common near small to medium-sized sandy streams.
- Trienodes smithi* Ross. Sites 14, 33, 44, 79. 10 May–23 June. Reported previously from Illinois (Ross, 1959). We collected specimens in an area of spring-fed ponds, and near small sandy streams.

CONCLUSIONS

In our three part checklist we recorded a total of 139 species of caddisflies from 43 genera and 17 families from Mississippi and southeastern Louisiana. Most of the more than 450 species of Southeastern caddisflies occur in areas of high topographic relief, particularly in the southern Appalachian region, where lotic habitats include large, meandering rivers, torrential mountain streams, cool springs and seeps. The majority of streams in the study area have sand and gravel bottoms, low gradients and warm waters. These conditions result in fewer microhabitats available to many species and limit the

occurrence of cool-adapted species. It is not surprising then that the families Leptoceridae, Hydropsychidae, Hydroptilidae, and Polycentropodidae accounted for 76% of the species reported (28%, 20%, 15% and 13% respectively). Species in these families, especially the Leptoceridae, are noted for their ability to exploit warm water habitats (Wiggins, 1977). This factor in large part accounts for the high numbers of species from these four families in our area.

The generally cool-adapted families Philopotamidae, Psychomyiidae, Glossosomatidae, Phryganeidae, Brachycentridae, and Limnephilidae were represented by species in genera with members secondarily adapted to warm waters, e.g. *Chimarra*, *Lype*, *Protoptila*, *Agrypnia*, *Ptilostomis*, *Brachycentrus*, *Micrasema*, *Ironoquia*, and *Pycnopsyche* (Wiggins, 1977). Species from other cool-adapted families, including *Rhyacophila glaberrima* (Rhyacophilidae), *Psilotreta rufa* (Odontoceridae), and *Lepidostoma* sp. (Lepidostomatidae) were restricted to the extreme northern part of the NCP or the TRH where cooler streams are more frequent. Species in the Sericosomatidae, Molanidae, and Calamoceratidae were almost always associated with cool springs and spring-fed streams, especially in the CP.

Approximately 35 southeastern caddisfly species appear to be restricted in distribution to the Gulf and Atlantic Coastal Plains where they usually are associated with black-water streams. Morse et al. (1980) recorded many of these species and Ross and Scott (1974) and Kelley and Morse (1982) noted the endemicity of several species of *Agarodes* and *Oxyethira*, respectively, to this region of North America. In the study area these coastal plain endemics included, *Chimarra florida*, *Neureclipsis melco*, *Cheumatopsyche petersi*, *Cheumatopsyche virginica*, *Hydropsyche elissoma*, *Hydroptila molsonae*, *Orthotrichia curta*, *Orthotrichia dentata*, *Oxyethira janella*, *Oxyethira novasota*, *Oxyethira sininsigne*, *Agarodes libalis*, *Oecetis daytona*, *Oecetis georgia*, and *Setodes dixiensis*.

A few typically northern species were collected only from the northern half of the NCP and the TRH and included *Hydropsyche simulans*, *Rhyacophila glaberrima*, *Ptilostomis ocellifera*, *Limnephilus* prob. *submonilifer*, *Pycnopsyche lepida*, *Pycnopsyche luculenta*, *Lepidostoma* sp., *Psilotreta rufa*, and *Triaenodes marginatus*.

Only *Neotrichia minutisimella*, a widespread eastern species, was restricted to the YD, where it was collected along the Mississippi River.

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LITERATURE CITED

- Etnier, D. A. and G. A. Schuster. 1979. An annotated list of Trichoptera (Caddisflies) of Tennessee. *J. Tenn. Acad. Sci.* 54: 15-22.
- Flint, O. S., Jr. 1960. Taxonomy and biology of Nearctic limnephilid larvae (Trichoptera), with special reference to species in eastern United States. *Entomol. Am.* 40: 1-117.
- . 1972. Three new caddisflies from the southeastern United States. *J. Ga. Entomol. Soc.* 7: 79-82.
- Haddock, J. D. 1977. The biosystematics of the caddis fly genus *Nectopsyche* in North America with emphasis on the aquatic stages. *Am. Midl. Nat.* 98: 382-421.
- Hagen, H. A. 1861. Synopsis of the Neuroptera of North America, with a list of the South American species. *Smithson. Misc. Collect.*, 347 pp.
- Kelley, R. W. and J. C. Morse. 1982. A key to females of the genus *Oxyethira* (Trichoptera: Hydroptilidae) from the southern United States. *Proc. Entomol. Soc. Wash.* 84: 256-269.
- Morse, J. C. 1971. New caddisflies (Trichoptera) from the southeastern United States. *J. Ga. Entomol. Soc.* 6: 77-84.
- . 1975. A phylogeny and revision of the caddisfly genus *Ceraclea* (Trichoptera, Lep-toceridae). *Contrib. Am. Entomol. Inst. (Ann Arbor)* 11: 1-97.
- Morse, J. C., J. W. Chapin, D. D. Herlong, and R. S. Harvey. 1980. Aquatic insects of Upper Three Runs Creek, Savannah River Plant, South Carolina. Part I: Orders other than Diptera. *J. Ga. Entomol. Soc.* 15: 73-101.
- Ross, H. H. 1938. Descriptions of Nearctic caddis flies (Trichoptera) with special reference to the Illinois species. *Ill. Nat. Hist. Surv. Bull.* 21: 101-183.
- . 1941. Descriptions and records of North American Trichoptera. *Trans. Am. Entomol. Soc.* 67: 35-126.
- . 1944. The caddis flies, or Trichoptera, of Illinois. *Ill. Nat. Hist. Surv. Bull.* 23: 1-326.
- . 1947. Descriptions and records of North American Trichoptera, with synoptic notes. *Trans. Am. Entomol. Soc.* 73: 125-168.
- . 1959. The relationships of three new species of *Triaenodes* from Illinois and Florida. *Entomol. News* 70: 39-45.
- . 1962. Three new species of Trichoptera from eastern North America. *Entomol. News* 73: 129-133.
- Ross, H. H. and D. C. Scott. 1974. A review of the caddisfly genus *Agarodes*, with descriptions of new species (Trichoptera: Sericostomatidae). *J. Ga. Entomol. Soc.* 9: 147-155.
- Unzicker, J. D., L. Aggus, and L. O. Warren. 1970. A preliminary list of the Arkansas Trichoptera. *J. Ga. Entomol. Soc.* 5: 167-174.
- Wiggins, G. B. 1977. Larvae of the North American caddisfly genera (Trichoptera). Univ. of Toronto Press, Toronto. 401 pp.